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Since the industrial revolution, the world economic development has been highly dependent on oil, coal and other fossil fuels. The resources are relentlessly consumed and on the verge of scarcity. The earth ecosystem and human living environment have been under constant pressure, which has led to a series of problems such as intensified geopolitical conflicts and frequent global extreme climate events, seriously threatening the sustainable development of human society. Breaking through the resources bottleneck and promoting the new “industrial revolution” with the “energy revolution” has become the primary task for mankind. Therefore, it is urgent to vigorously develop clean and renewable energy, continuously improve energy supply, and continuously reduce emissions and carbon.

In recent years, the non-renewable resources consumption has led to weak total energy growth¹, but the installed capacity of clean energy, represented by photovoltaics, continues to grow at a high speed, and becomes the dominant incremental energy supply. In 2022, the global new installed photovoltaics capacity was 255GW, up 40% year-on-year², and the global annual compound growth rate of photovoltaic installed capacity reached 23% in 2013-2022. Among them, China contributed 87.4GW of newly installed capacity, accounting for 39%³ of total, with a year-on-year increase of 59.3%⁴ and a 10-year compound growth rate of 26%. In 2023, the global newly installed photovoltaic capacity is expected to exceed 400GW, of

¹ “BP Statistical Review of World Energy (2021 Edition)” saw a 10-year annual compound growth of 1.9% in disposable energy consumption in 2009-2019, and the negative growth in 2020 due to the pandemic was not included in the statistical scope.

² Bloomberg “1Q 2023 Global PV Market Outlook”

³ According to the Analysis and Forecast Report on the 2023 National Power Supply and Demand Situation by China Electricity Council, the 2022 newly installed power generation capacity in China was 200 million kW.

⁴ National Energy Administration and CPIA



which China is forecast to be over 120GW, an expected increase of more than 40%. Under the background of extreme climate change and the long-term governments' strategic support for new energy installations, we predict that by 2030, the annual new installed photovoltaic capacity will reach 1 Terawatt level.

Major economies are stepping up the formulation and implementation of carbon border trade policies, and low-carbon emission requirements will become the new international trade rule in the future. In February 2023, the European Union formally adopted the Carbon Border Adjustment Mechanism (CBAM), and will impose "carbon tariffs" on products in six major fields including electricity in 2026. In 2022, the Clean Competition Act (CCA) was submitted to the Congress of the United States, which proposed that the US should adjust its carbon border on energy-intensive imported products from 2024, and also encouraged the decarbonisation of American manufacturing industry. In the future, international carbon tariffs will become the core component of the world trade system, which will undoubtedly lead to the further increase of the traditional energy generation cost. Therefore, it is the only way for enterprises who want to lock in future competitive advantages to gain footprint in green manufacturing and build an internationally recognized "zero-carbon factory".

At present, global trade disputes are intensifying. Some countries and regions, such as India and the United States, have successively adopted trade protection and industrial support policies, trying to establish and improve their domestic manufacturing systems and reduce their dependence on China's photovoltaic capacity. India has announced a new round of Production Linked Incentive (PLI) Scheme to develop 65GW capacity in India through financial incentives. The United States has successively introduced a series of trade protection measures and political means, such as anti-dumping of photovoltaic products, Sections 201 and 301, in an effort to restrict and suppress the photovoltaic products export of China. Meanwhile, the United States passed the Inflation Reduction Act (IRA), which provided a series of tax and subsidy measures on both the supply and demand sides of photovoltaics, including the manufacturing tax credit for solar photovoltaic materials at the photovoltaic manufacturing end, and increasing the proportion and duration of tax credit to stimulate local photovoltaic demand, attract photovoltaic enterprises to set up factories in the United States, and help them rebuild the local photovoltaic industry chain. Recently, the European Commission announced the Green Deal Industrial Plan (GDIP), which plans to optimize the regulatory environment, financing channels, industrial skills and trade openness of the EU photovoltaic industry in order to achieve a more flexible supply chain. The governments' promotion of the photovoltaic supply chain localization is not only a challenge but also a new opportunity to broaden the international market for China photovoltaic enterprises with global leading technological advantages. Therefore, it is an important task and a severe challenge for China photovoltaic enterprises to steadily accelerate the strategic layout of overseas production capacity, broaden overseas financing channels, establish dialogues with global capital markets, and accelerate the absorption and training of international talents.



BUSINESS REVIEW FOR 2022

In 2022, GCL Technology produced a total of 104,723 MT of polysilicon (excluding the output of associate companies) and 46.66 GW of monocrystalline silicon, up 120% and 22.4% year-on-year. For the year ended 31 December 2022, the Company recorded revenue from continuing operations of RMB35,930 million, an increase of 113.0% compared with the corresponding period in 2021; the gross profit was approximately RMB17,496 million, an increase of 213.9% compared with the corresponding period in 2021. The profit attributable to owners of the Company from both continuing operations and discontinued operations was approximately RMB16,030 million, and the basic earnings per share was approximately RMB59.98 cents. The Board recommended the payment of a final dividend of HK\$0.06 per share for the year ended 31 December 2022, resulting in a total distributed profit of HK\$1,593 million⁵.

GCL TECHNOLOGY REDUCED ITS SHAREHOLDING IN GCL NEW ENERGY TO MAXIMIZE ITS LONG-TERM VALUE

In the whole photovoltaic industry chain, GCL Technology continues to take the lead by virtue of technological innovation. However, as the GCL New Energy achieved its light-asset strategy transformation, GCL Technology gradually changed from the downstream business alone of the photovoltaic industry chain to other diversified clean energy businesses. The operational and financial synergy between the two companies gradually weakened.

Considering the overall development sustainability and shareholders' returns, the Group aims to concentrate on strengthening resources to develop the core business of polysilicon materials, create long-term value for shareholders, make the photovoltaic upstream business structure more clear, prominent and competitive, enhance the investment attraction and truly leverage the value of the stock market. As such, GCL Technology completed the distribution of GCL New Energy ordinary shares by way of distribution in specie ("**DIS Shares**") to qualified shareholders on 29 September 2022, and the Group's shareholding in GCL New Energy decreased from 44.44% to 7.44%. As GCL New Energy is no longer included in the Group's consolidated statements, the Group had an enhanced transparency in financial position, which will help the capital market to re-evaluate the GCL Technology's growth potential and profitability, and assist the Group to better play its inherent long-term potential and maximize its long-term value.

⁵ Subject to the approval of the shareholders at the forthcoming annual general meeting of the Company.



OPENNESS AND WIN-WIN COOPERATION TO BUILD A NEW PHOTOVOLTAIC INDUSTRY ECOSYSTEM

With the continuous iteration of photovoltaic technology, the standardized production technology has gradually led to homogeneous industry competition, and many enterprises have adopted integrated strategies to maintain their competitive advantages. However, the Company has adopted a unique way to focus on breaking the industry bottleneck, promoting differentiated competition with technological progress, and building an open industrial ecosystem with an open, cooperation and win-win attitude. Following the deep cooperation of Baotou granular silicon project with industry and capital players, the Company joined hands with its joint ventures Xinhua Semiconductor, TCL Technology and Tianjin Zhonghuan Semiconductor in April 2022 to build a production base of 100,000 tons of granular silicon and 10,000 tons of semiconductor-grade polysilicon in Hohhot, to jointly explore a new cooperation mode and collaborate to build a new photovoltaic industry ecosystem.

EXPLORING THE NEW TECHNOLOGY DIRECTION, AND EMPOWERING “GCL TECHNOLOGY” WITH INNOVATIVE TECHNOLOGY

Technology is the “first energy”. GCL Technology has continuously broken through key technologies in the industry, and promoted the industry progress with technology. In 2022, the Company continued to strengthen its technology gene, took technology industrialization as the main theme, improved the technology management system, cultivated technological talents, explored new technology directions, increased investment in technology research, and realized technological fission:

In 2022, the Company invested RMB1.686 billion in R&D, up 61.99% year-on-year, accounting for 4.69% of the annual revenue. In 2022, the Company filed 139 new patent applications, including 41 invention patents; and obtained 108 authorized patents, including 3 invention patents.


Since the start of the polysilicon project, the Company is based on its own products and technology, actively participates in the establishment of various silicon material standards. Since 2013, the Company has led and participated in the formulation of 39 standards, of which the Company led and participated in the formulation of 3 and 3 SEMI international standards respectively; led and participated in the formulation of 7 and 15 national standards respectively; led and participated in the formulation of 2 and 4 industry standards respectively; led and participated in the formulation of 3 and 2 group standards respectively. The Company has become a veritable principal maker of polysilicon industry standards. In 2022, the Company led the formulation of 1 national standard, which has been approved and will be released soon. The 4 industry standards the Company led in formulation have also been completed, and are expected to be examined and approved by the end of 2023.



On 29 December 2022, the “FBR-based Granular Silicon Large-Scale Low-Carbon Production Technology (硅烷流化床顆粒硅規模化低碳生產技術)” of the Company won the First Prize of China Non-ferrous Metals Industry Science and Technology Award (中國有色金屬工業科學技術一等獎). As a leading technology of cutting-edge silicon-based materials in the world, FBR-based granular silicon has been officially listed as the key task of advanced technology in the “14th Five-Year Plan for Scientific and Technological Innovation in the Energy Sector (《「十四五」能源領域科技創新規劃》)” issued by the Ministry of Science and Technology and the National Energy Administration with clear recognition and authoritative certification from the national level in the form of policy planning documents.

The granular silicon technology application demonstration project is a key measure for GCL Technology to lead the photovoltaic industry innovation and technological revolution, plays an important role in the GCL Technology transformation and upgrading and strongly enhances its competitiveness. On the basis of Xuzhou Photovoltaic 5GW granular silicon monosilicon application demonstration project, the Company newly started Ningxia GCL Photovoltaic 5GW granular silicon N-type monosilicon demonstration project, which was successfully put into production on 25 November 2022, marking the arrival of the mass production era of successful granular silicon application on N-type products. In fact, the Company has been continuously developing and breaking through key technologies in recent years, such as “CCZ+ granular silicon application + N-type + large-size slicing”, around the downstream application scenarios and industrial granular silicon ecosystem.

The large-scale granular silicon application in demonstration projects has brought significant cost and quality advantages. Practice has proved that granular silicon products have good fluidity, and can perfectly replace monosilicon feeding. Meanwhile, the granular silicon morphology is better than that of monosilicon feeding, as the particles with a size of about 2mm have good fluidity. At the same time, granular materials also have many advantages, such as large single feeding amount, high melting efficiency, no crushing and low impurities. Due to the excellent quality and matching appearance and performance of granular silicon, it has brought cost advantages to crystal pulling production in the production of application demonstration projects, and the comprehensive cost of granular silicon wafer products takes the lead in the industry. At present, the granular silicon application demonstration project has been equal in the unit yield and electrochemical performance to that of first-class rod silicon, and can have more excellent performance in electrochemical performance in the future.





GCL Technology has always adhered to the innovative R&D concept of “one generation in production, one generation in R&D, one generation in reserve and one generation in nurture”, quickly realized the landing of granular silicon production capacity, and accelerated the research and development of a new generation of granular silicon technology, research and development reserves of CCZ and other new technologies and exploration of perovskite and other cutting-edge technological directions.

Jiangsu Xinhua Semiconductor Technology Co., Ltd. (Xinhua Semiconductor), jointly initiated by the Group and the China Integrated Circuit Industry Investment Fund (CICF) Co., Ltd., has become the largest domestic electronic-grade polysilicon manufacturer for semiconductor industry. The electronic-grade polysilicon for large-scale integrated circuits has broken the foreign technology and markets monopoly and filled the gap in the domestic industry. As the leading unit, the Company participated in the revision of the national electronic-grade polysilicon standard.

CCZ technology independently developed by the Company (namely continuous Czochralski monosilicon technology) further optimizes the application scenario with granular silicon as raw material, bringing more rapid progress space for monosilicon production. It is characterized by simultaneous feeding - melting - crystal pulling in a monosilicon furnace, which can save time for the cooling and feeding of crystal rods. At present, the GCL CCZ monosilicon crystal pulling furnace can reach the yield of 185kg/d (kg/day), and has realized the pilot production capacity of 200MW (megawatts). With the large-scale promotion of N-type monosilicon and large-diameter monosilicon, CCZ will show more prominent technical advantages.

The new generation of photovoltaic perovskite solar cells is considered as one of the most promising solar cell technologies in the future because of its advantages of higher theoretical conversion efficiency, faster iteration speed, short process flow, low raw material cost and lower production energy consumption. Currently, the perovskite module of 1m x 2m produced by Kunshan GCL Optoelectronic Material Co., Ltd (昆山協鑫光電材料有限公司 GCL Optoelectronic), a subsidiary of GCL Technology, which is the largest-size product of its kind in the world has commenced production, therefore, the Company has a comprehensive R&D and production capability of large size components. The photoelectric conversion efficiency of its largest-size perovskite module has reached 16% and is expected to exceed 18% by the end of 2023. On 18 January 2023, GCL Optoelectronic obtained the 3C certification of perovskite module BIPV photovoltaic glass issued by China Quality Certification Center (CQC), which took an important step to explore the domestic building photovoltaic market. The certified unit products submitted by the Company have successfully passed the tests of moisture resistance, heat resistance, radiation resistance, falling ball impact peeling performance, shotgun impact performance, etc., and successfully obtained the 3C certification, which indicates that the new perovskite module products developed by GCL Optoelectronic for BIPV (Building Integrated Photovoltaics) market have obtained the “passport” to enter the China market.



FULL DIGITALIZATION PROMOTION LEADS TO GORGEOUS “DIGITAL GCL” TRANSFORMATION

The Company's key project bases make full use of the innovative achievements of industrial interconnection, intelligent manufacturing and digital twin, deepen the production system digitalization, provide accurate, timely and reliable data support for production process, technology and quality optimization, reduce management costs and improve production efficiency. Relying on Xuzhou Digital Center, the granular silicon project makes use of the automatic, intelligent and intensive central control system, cloud big data platform, the whole-chain mass data intelligent analysis and application, enables advanced technologies of Industry 4.0 such as AR Hawkeye system, thermal imaging inspection system and unmanned aerial vehicle system to release their potential, remotely controls all core bases in Sichuan, Inner Mongolia and other areas, promotes rapid granular silicon modular replication, and realizes strategic goal modeling, business value modeling, process system modularization and digital production and operation. Many subsidiaries of the Company have been listed as “Intelligent Demonstration Factory” and “Industrial Internet Benchmark Factory” at or above the provincial level for several times, and their demonstration and leading role in the industry has been increasing day by day.

GCL Technology embeds digital transformation into business management, realizes collaborative management and control of core business processes such as R&D, production, supply chain, sales and finance, improves lean management, reduces operating costs, and effectively provides data analysis and decision-making support for various business management. The Company has built digitalized headquarters, and established four mobile applications, namely, fund analysis, financial analysis, expense analysis and talent portrait. By managing the cockpit, the Company has realized all-round control of penetrating management and progressive analysis. The Company uses the big data platform for business modeling, strengthens data sharing, consolidates the data base, strengthens the analysis and mining of various business management and production data, establishes a benchmarking management with upstream and downstream enterprises in the industry, realize the asset digitalization and digital capitalization, and promote the gradual transformation and upgrading of GCL Technology from real economy to digital economy.



PRACTICING GREEN MANUFACTURING TO LEAD THE GREEN INDUSTRY DEVELOPMENT WITH A “GREEN GCL”

Photovoltaic products are amplifiers of electric energy, and the energy consumption of product manufacturing is the fulcrum of amplifying photovoltaic power generation. Polycrystalline silicon is the “major consumer” of electricity in photovoltaic manufacturing. To control and reduce production energy consumption scientifically and effectively will serve as a fulcrum to incite the green industry development. In 2022, the average comprehensive power consumption of polysilicon industry was 60kWh/kg-Si, the average steam consumption was 15.0kg/kg-Si, and the per capita output was 58 tons/(person-year)⁶. At present, the Company is leading in the industry in all the data of Siemens rod-shaped silicon. The comprehensive power consumption of granular silicon has been optimized to 13.8 kWh/kg-Si, the steam consumption to 15.3 kg/kg-Si, and the per capita output to 133 tons/(person-year). According to the 2022 granular silicon output of 45,599 metric tons, the Company can save 2.1 billion kWh of electricity for China and reduce 1.18 million tons⁷ of carbon emissions for the industry.

While continuously promoting energy conservation and emission reduction in the value chain, the Company also continuously improves and optimizes its own environmental performance. The subsidiaries have obtained a number of green and low-carbon certifications. Suzhou GCL passed the certification of Jiangsu Provincial Green Factory. Through steam reuse, Baotou factory significantly reduced energy consumption in the production process and effectively saved energy resources. Leshan GCL not only produced raw materials for green photovoltaic products, but also used 100% clean energy in the production process, and obtained the Clean Energy Consumption Certificate issued by Sichuan Electric Power Trading Center, which further enhanced GCL's green production influence in the industry.


⁶ China Photovoltaic Industry Development Roadmap (2022-2023).

⁷ The emission intensity of unit power generation in China is 0.558kg/kWh, data source: “Annual Development Report of National Electric Power Industry 2022”.



Facing the future global market, the carbon footprint certification system has been continuously improved in all links of the photovoltaic industry chain, and the application of low-carbon products has opened up a new competition track for module products. In July 2022, the large-size PERC module produced with granular silicon has been certified by a French organisation in carbon footprint, with an average carbon footprint of 400-450 kg CO₂/kW, which is approximately 10%-20% lower than that of the same model module products without granular silicon, and has obvious low-carbon advantages. The wide application of granular silicon will help the Company's customers to explore the national and regional markets around the globe that focus on carbon footprint, and obtain obvious market benefits. As the only raw material product that helps measure the carbon emission rights of the photovoltaic industry chain, the low-carbon property of granular silicon is a key link to optimize the full-scale carbon emission measurement of the photovoltaic industry, and also the core technology for the photovoltaic industry to implement technical carbon reduction. It is conducive for enterprises to establish a carbon price risk response mechanism, cope with the overall operating costs due to the rising carbon price costs, and fully empower customers.

ADVANCING MANAGEMENT REFORM TO OPTIMIZE HUMAN RESOURCE MANAGEMENT EFFICIENCY



Talent is the primary task and top priority of GCL Technology. In the new cycle, the Company will make great efforts to optimize the organizational structure, and continue to strengthen the human resources system construction, optimize the human resources management efficiency and improve the return on human capital investment, focusing on "talent management, value distribution, efficiency improvement and cultural construction", according to the strategic planning and project construction progress. In terms of "talent cultivation", the Company will continue to strengthen the introduction, training, incentives and retention of four types of core talents, namely, "inter-disciplinary management talents with one specialty and many skills, R&D technical talents, high-skilled industrial workers and international talents". Meanwhile, the Company will build an internal talent supply chain through major special projects such as "joint chain leader system", "craftsmen assessment and employment" and "global management trainee introduction", and make a good talent layout in advance for key projects and key development areas, so that talent reserves can be prepared in advance for the project implementation. In terms of "value distribution", the Company stimulates the employees' motivation and value creation by creating a fair and just assessment culture, constructing a short-, medium- and long-term cash-out mechanism and leading salary strategies. For core management, R&D and technical talents, the Company adopts the partnership form and long-term incentive plans such as stocks and options to promote the achievement of organizational goals and realize talent retention. During the year, the Company awarded 290 million shares to core and outstanding personnel at a price of HK\$0.86 per share twice. In the aspect of "efficiency improvement", the Company



has built an internal human efficiency management system through digital means, distributed the human efficiency improvement goal to production units such as workshops and sections, carried out vertical benchmarking with history, and horizontal benchmarking with leading peers in the industry, so as to promote organizational efficiency improvement through management improvement. In terms of "cultural construction", the Company will improve the working environment, implement employee care plan and welfare system, and enhance employees' work experience, to make employees feel "happier" at work, and continue to create a "family culture" with temperature and influence.

LAUNCHING SHARE REPURCHASE TO GIVE BACK LONG-TERM VALUE TO SHAREHOLDERS

In the second half of 2022, the Company's share price was also at a low level, affected by the international economic environment and the continuous sluggishness of the Hong Kong stock market. In response, the Company repurchased a total of approximately 200 million shares according to the share incentive plan for employee incentives. In December, the Company further repurchased 31.625 million shares for cancellation.

The Company's share repurchase and cancellation show its confidence in its future development prospects and high recognition of its value. We believed that the Company will further improve the long-term incentive mechanism, fully mobilize the initiative of the core backbone and outstanding employees, cultivate loyalty, enhance operational management capabilities, promote industrial development, and give back long-term value to shareholders.

MAKING IMPROVEMENTS BOTH INTERNALLY AND EXTERNALLY AND ADDRESSING IN SYMPTOMS AND ROOT CAUSES TO STRENGTHEN ENVIRONMENTAL, SOCIAL AND GOVERNANCE PERFORMANCE AND IMPROVEMENT

Regarding corporate governance, GCL Technology continued to optimize the Group governance level from multiple dimensions such as compliance, responsibility, transparency, equality, efficiency and diversity under the effective guidance of its long-term governance objectives. The Company deeply integrated ESG governance into the development strategy and practice, and established the Environment, Society and Governance Committee (ESG Committee) to directly manage ESG-related work, forming a three-level ESG governance structure: the Board or Directors, the ESG Committee and the ESG working group, furthering the Board and the management participation in ESG work, and continuously improving its ESG management level and construction ability.



In terms of environmental responsibility, the Company integrated the green development concept into the whole production management process from the perspectives of system construction, management innovation, awareness improvement and technical iteration, and launched green and low-carbon management in the process of production and operation in an all-round way. Meanwhile, under the global green and low-carbon development trend, the Company has also promoted the deep carbon control and emission reduction in photovoltaic industry through the continuous innovation of low-carbon silicon-based material FBR granular silicon, and kept promoting the green renewable energy development with the innovation of low-carbon silicon-based granular silicon, to drive energy saving and carbon reduction through technological innovation, and deeply integrate company development and innovation with the “dual carbon” goal.

In 2022, GCL Technology actively made reference to the Task Force on Climate-Related Financial Disclosure (TCFD) to carry out the work to deal with climate change, fully considered the potential impact of national climate action and global energy transformation trend on the industry, carefully identified and analyzed its own climate risks and opportunities, and further formulated targeted countermeasures to enhance the Company's adaptability and operational resilience in the face of climate change.

With regard to social responsibility, GCL Technology has always been committed to creating value for customers, building a platform for employees, giving back to the society, and working hand in hand with partners to create a sustainable industry ecosystem. In terms of talent development, the Company will focus on optimizing the talent structure and strengthening the talent echelon construction to create a stable talent supply chain for its global development. In terms of giving back to the society, GCL Technology has always been committed to building a social responsibility matrix, pursuing the sustainable development, establishing a close connection between the Company and communities in all directions, promoting the co-construction and sharing between communities and the Company, driving social growth and helping achieve economic prosperity.



TECHNOLOGICAL GCL, THE FUTURE HAS COME

The year of 2023 is the first year for the new government's administration, and also a crucial year for the implementation of the "14th Five-Year Plan". The photovoltaic industry will enter the "excess supply" state for the first time after a wide range of fare and low price grid access, gradually breaking the supply restrictions at the product end. The low cost and high convenience advantages of photovoltaic power generation are increasingly favored by energy investment and even the consumer market. It is estimated that the incremental photovoltaic installed capacity for the whole year will exceed 100GW for the first time, and the new blue ocean of China photovoltaic industry has been unveiled to us.

In the face of brand-new energy changes and market challenges, GCL Technology will, as always, adhere to the long-term principle of not making quick money or profiteering, be open, inclusive and achieve win-win situation through cooperation, and strive to solve the bottleneck problems in high-quality polysilicon production capacity. The Company will seek progress and upgrading while maintaining stability, promote innovation through digital empowerment, aim to win the future through change, pay close attention to management, strengthen financial stability, and work hard to improve quality and significantly reduce costs. We will withdraw from Siemens rod silicon production field in an orderly manner and deepen green production, continue to promote the matrix construction of FBR capacity at a scale of ten-thousand tons, and double the market share of granular silicon. The Group will strive to realize CCZ process mass production and perovskite technology commercialization, carry out international strategic discussions, speed up the overseas R&D layout, integrate global R&D resources, and employ technological innovation to promote the early realization of the "double carbon" strategic goal.

I sincerely thank the Board of Directors, management team and all employees for their hard work and silent dedication in 2022, and I also deeply thank the shareholders and partners for their long-term support.

